Patent Claims

1. A metering system (1) for metering a metered medium comprising
- a frame housing unit (2),
- a lever mounting unit (3) which is supported on the frame housing unit (2) comprising a lever mount (4),
- a lever (30) which is supported rotatably by means of the lever mount (4) about a tilt axis (R) comprising a two-sided lever arm (31) extending substantially in a longitudinal direction (30L) of the lever (30),
  wherein one lever arm side (35) has a first actuator engagement point (36) close to the tilt axis and is in contact remotely from the tilt axis at an end portion (33) with an ejection element (13) and
  wherein the other lever arm side (32) has a second actuator engagement point (37) close to the tilt axis,
- two actuators (50a, 50b), which, during operation, exert a tilting moment in opposite directions on the lever (30) at the first and second actuator engagement point (36, 37),

wherein the actuators (50a, 50b) are placed obliquely to one another maximally at a 150˚ angle in a V-shaped manner and wherein together, the lever mounting unit (3), the lever (30), and the two actuators (50a, 50b) form a movement mechanism (3, 4, 5, 30, 50a, 50b), which is braced on the frame housing unit (2) by means of at least one spring element (21).

2. The metering system according to claim 1, wherein the lever (30) is asymmetrical, wherein the lever arm side (35) that is longer, has a first actuator engagement point (36) close to the tilt axis and is in contact remotely from the tilt axis at an end portion (33) with an ejection element (13), and wherein the lever arm side (32) that is shorter, has a second actuator engagement point (37) close to the tilt axis.

3. The metering system according to claim 1 or 2, wherein the ejection element (13) is a ram (13).

4. The metering system according to one of the preceding claims, wherein the spring element (21) is arranged so that it braces the lever mounting unit (3) against the frame housing unit (2) via the lever (30) as well as via the two actuators (50a, 50b).

5. The metering system according to one of the preceding claims, wherein the two actuators (50a, 50b) are located on a common longitudinal side of the lever (30).

6. The metering system according to one of the preceding claims, wherein the actuators (50a, 50b) are placed obliquely to one another maximally at a 120˚ angle, preferably maximally at a 90˚ angle, particularly preferably maximally at a 60˚ angle, and most preferably maximally at a 30˚ angle in a V-shaped manner.

7. The metering system according to one of the preceding claims, wherein the actuator engagement points (36, 37) on the lever (30) for the actuators (50a, 50b) are not located in a plane of the tilt axis (R).

8. The metering system according to one of the preceding claims, wherein the lever (30) is formed and arranged in such a way that the actuator engagement points (36, 37) are positioned in the lever (30) further away from a longitudinal side of the lever (30) facing the actuators (50a, 50b), than the tilt axis (R), on which tilt axis (R) the lever (30) is supported rotatably.

9. The metering system according to one of the preceding claims, wherein the actuators (50a, 50b) engage with the actuator engagement points (36, 37) in such a way that in a central position (P_0) of the lever (30), a longitudinal axis (52a, 52b) of the actuators (50a, 50b) is in each case substantially perpendicular to a respective connecting line (V_a, V_b) between the respective actuator engagement point (36, 37) and the tilt axis (R).

10. The metering system according to one of the preceding claims, wherein the actuators (50a, 50b) are arranged tangentially on a circle (K) about the tilt axis (R) on the actuator engagement points (36, 37) in such a way that they substantially perform a straight movement during operation for metering a metered medium in response to an ejection and withdrawal movement.

11. The metering system according to one of the preceding claims, wherein the lever (30) has an inhomogeneous mass distribution.

12. The metering system according to claim 11, wherein a mass of the lever (30) is distributed relative to the tilt axis (R) along the lever (30) in such a way that the lever (30) as a whole, based on the tilt axis (R), has a smallest possible (mass) moment of inertia.

13. The metering system according to one of the preceding claims, wherein the lever (30) has a plurality of recesses (38) for weight reduction purposes.

14. The metering system according to one of the preceding claims, wherein a total mass of the metering system (1) is divided substantially evenly to the frame housing unit (2) and the lever mounting unit (3).

15. The metering system according to one of the preceding claims, wherein the lever mounting unit (3) is of multi-part construction and comprises a fluidic positioning (5) for a fluidic unit (8) of the metering system (1) in addition to the lever mount (4).

16. The metering system according to claim 15, wherein the lever mount (4) is connected in a rotatable manner to the fluidic positioning (5) via a rotary joint (6),
and/or wherein the lever mount (4) and the fluidic positioning (5) are supported in a mechanically adjustable manner against one another.

17. The metering system according to one of the preceding claims, wherein the lever mounting unit (3) comprises a ring construction (4, 5), which encloses a portion (2') of the frame housing unit (2) in a ring-like manner by leaving at least one gap.

18. The metering system according to claim 17, wherein the lever mounting unit (3) is supported on the frame housing unit (2) in a displaceable manner by means of the spring element (21), which is arranged in a gap between the lever mounting unit (3) and the portion (2') of the frame housing unit (2),
and/or
wherein the ring construction (4, 5) comprises a (the) rotary joint (6), and the lever mount (4) of the lever mounting unit (3) is coupled to the fluidic positioning (5) in a mechanically adjustable manner via the lever (30) and the ram (13) for adjusting a ram-nozzle distance on a side of the fluidic positioning (5) remotely from the rotary joint by means of an adjusting element (7), in particular an adjusting screw (7).

19. The metering system according to one of the preceding claims, wherein the actuators (50a, 50b) are in each case formed in an encapsulated manner,
and/or wherein both actuators (50a, 50b) in each case comprise at least one temperature sensor (65).

20. The metering system according to one of the preceding claims, wherein a cooling device (60), through which gas or liquid flows, in each case surrounds the actuators (50a, 50b).

21. The metering system according to claim 20, wherein the cooling device (60) has a feed channel (61) between the actuators (50a, 50b) comprising inlets (62) into the actuators (50a, 50b) and two eccentric discharge channels (63a, 63b) comprising outlets (64) into the discharge channels (63a, 63b).